

Design Memorandum No. 2 - 2003

TO: Engineering Offices and Divisions
Districts
Consulting Engineers

FROM: Mark S. Gaydos, P.E., Design Engineer

DATE: January 22, 2002

SUBJECT: Preventive Maintenance Project Concept
Reports

Design Manual Reference:

Section II-05

____ Revision
____ ° Supplemental

Introduction

This memorandum provides the format to be followed in preparing Preventive Maintenance project concept reports (PCR). It also provides an example PCR.

Implementation

The use of this format is to be implemented immediately. It replaces the guidance on project concept reports given in Design Memorandum No. 02-03.

Guidance

Preventive Maintenance Project Concept Reports require a draft circulation to District and Office holders only, summary of comments and a formal cover. See the attached format and example.

Questions

Any questions regarding the content or implementation of this memorandum should be referred to Ronald J. Henke, Design Division, 701-328-4445.

Approved

Francis G. Ziegler, P.E. - Director, Office of Project Development

Date

20/rjh/Design Memorandum 2 2003.wpd

attachment

c: FHWA

**PROJECT CONCEPT REPORT
PREVENTIVE MAINTENANCE
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION**

Date: _____

This project concept report is submitted for your consideration and approval:

PURPOSE AND NEED

Project Description:

Project No.: _____ PCN No.: _____

County: _____

Location and Length (Gross and Net): _____

Highway Functional Classification:

G NHS	G NON-NHS	G Rural	G Urban
G Interstate	G Interregional		
G State Corridor	G District Corridor	G District Collector	

Existing Conditions:

Driving Surface Type: _____ Width: _____ ft

Shoulder Surface Type: _____ Width: _____ ft

Most Recent Improvement Type and Year: _____

Pavement Age: _____ Effective Pavement Age: _____

Foreslope Ratio: _____

Traffic Data:

Current ADT: _____ Percent Trucks: _____ ESAL's: _____

Pavement Conditions:

	Average Score	
Distress Score:	_____	Rating (Excellent, Good, Fair, Poor)
Ride Score:	_____	
IRI (in/mile):	_____	PRPI Value (Excellent, Good, Fair, Poor)
Rut (in)	_____	

Average Pavement Condition Rating Deduct Values

Flexible: Asphalt or Composite (AOCRC or AOPJC)	Concrete: (Jointed or Continuous Reinforced)
Alligator Cracking	"D" Cracking
Bleeding	Corner Breaks
Longitudinal Cracking	Longitudinal Joint Spalling
Transverse Cracking	Longitudinal Cracking
Block Cracking	Transverse Cracking
Raveling/Weathering	Transverse Joint Spalling
Bituminous Patching	Faulting
Rutting	Broken Slabs
	Bituminous Patching
	Concrete Patch Det.
	Blow-Up Repairs

5 year ave. yearly Maintenance Cost (\$/mi): _____

ALTERNATIVES

Proposed Improvements:

Flexible: Asphalt or Composite (AOCRC or AOPJC)

- G** Seal Coat
- G** Micro Surfacing
- G** HBP - Thin Lift Overlay (1½") and Patching
- G** Milling
- G** Other: _____ ***

Concrete: (Jointed or Continuous Reinforced)

- G** Minor CPR
- G** • Spalls
- G** • Blow-Ups
- G** • Broken Panels
- G** • Punchouts
- G** • Joint & Crack Sealing
- G** • Finger Joints (repair & replace)
- G** • Underdrain (repair & cleaning)
- G** Grinding
- G** Other: _____ ***

*** *If the proposed improvement is OTHER, discuss here, or include as an attachment.*

Narrative of Proposed Improvements:

A brief summary of the proposed improvements (type of work being done) and justification of why the improvements should be completed.

Proposed Cross Sectional Elements:

Surfaced Roadway Width: _____ ft
Shoulder Width: _____ ft
Foreslope Ratio(H:V): _____ ft:ft

G Existing and Proposed Typical Sections are attached.

Existing and Proposed Typical Sections should be included for projects that change the roadway typical section including Micro Surfacing, HBP Thin Lift Overlay, HBP Patching, and Milling projects.

Proposed Special Design Elements:

Design Exception Proposed for shoulder width
(per Preventive Maintenance Guidelines): Yes _____ No _____

If yes, discuss the design exception and include as an attachment.

Estimated Cost: \$ _____

G Detailed Cost Estimate Attached

Programmed Cost: \$ _____

Use the State Transportation Improvement Plan to find Programmed Costs.

Cost Effectiveness:

Estimated Design Life of Proposed Improvement: _____ yrs

Estimated Cost/Mile: \$ _____

G The estimated service life and estimated cost per mile are within the range determined to be cost effective for the proposed improvements as identified in Design Memorandum 02-01 “ Preventive Maintenance Cost Effectiveness Guidelines”.

G A Cost Effectiveness Analysis attached.

For work activities not identified in the Preventive Maintenance Cost Effectiveness Guidelines, the cost effectiveness shall be determined by comparing the Life Cycle Costs (Net Present Worth) for the proposed work versus reconstruction or other appropriate work.

IMPACTS

Wetlands: Yes _____ No _____

Cultural: Yes _____ No _____

Discussion:

Generally this work will be conducted only on top of the existing roadway so there will be no impacts to wetlands or cultural resources. If there is an activity proposed that may have an impact, it should be discussed in “Proposed Improvements” and the impacts discussed in this section.

SUMMARY OF DISTRICT ENGINEER AND OFFICE HOLDERS COMMENTS

District Engineer

Comments: _____

Office of Operation (Gary Berreth)

Comments: _____

Office of Project Development (Francis Ziegler)

Comments: _____

Office of Transportation Program Services (Tim Horner)

Comments: _____

DECISIONS

1) Should this project continue to be advanced?

Yes _____ No _____

2) Do you concur in the project concepts proposed?

Yes _____ No _____

Comments: _____

Approved:

Grant Levi, P.E., Deputy Director For Engineering

Date

Format Revised January, 2002

THIN LIFT OVERLAY

Project No.

SNH-6-081(058)218

PCN

14769

US 81 from RP 218.580 to RP 228.331



Prepared by

**NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
BISMARCK, NORTH DAKOTA**

Website: <http://www.state.nd.us/dot/>

DIRECTOR

David A. Sprynczynatyk, P.E.

PROJECT DEVELOPMENT DIRECTOR

Francis G. Ziegler, P.E.

Principal Author: Jon Doe

December 2001

**PROJECT CONCEPT REPORT
PREVENTIVE MAINTENANCE
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION**

Date: 12-15-01

This project concept report and proposed environmental classification is submitted for your consideration and approval:

PURPOSE AND NEED

Project Description:

Project No.: SNH-6-081(058)218 PCN No.: 14769

County: Pembina

Location and Length: US 81 from RP 218.580 East of the Jct. of ND 5 to RP 228.331 West of the Jct. with I-29. The project is 9.616 miles.

Highway Functional Classification:

: NHS	G NON-NHS		: Rural	G Urban
G Interstate	9 Interregional			
: State Corridor	G District Corridor		G District Collector	

Existing Conditions:

Driving Surface Type: Asphalt Width: 24 ft

Shoulder Surface Type: Asphalt Width: 1.5 ft

Most Recent Improvement Type and Year: 1993, Chip Seal

Pavement Age: 48 Effective Pavement Age: 24

Foreslope Ratio: 4:1

Traffic Data:

Current ADT: 1365 Percent Trucks: 1% FSAL's: 110

Pavement Conditions:

Average Score

Distress Score: 83 Fair Rating (Excellent, Good, Fair, Poor)

Ride Score: 3.31

IRI (in/mile): 92.57 Fair PRPI Value (Excellent, Good, Fair, Poor)

Rut (in) 0.12

Average Pavement Condition Rating Deduct Values

Flexible: Asphalt or Composite (AOCRC or AOPJC) Concrete: (Jointed or Continuous Reinforced)

Alligator Cracking	<u>2</u>	"D" Cracking	<u> </u>
Bleeding	<u>0</u>	Corner Breaks	<u> </u>
Longitudinal Cracking	<u>3</u>	Longitudinal Joint Spalling	<u> </u>
Transverse Cracking	<u>7</u>	Longitudinal Cracking	<u> </u>
Block Cracking	<u>0</u>	Transverse Cracking	<u> </u>
Raveling/Weathering	<u>0</u>	Transverse Joint Spalling	<u> </u>
Bituminous Patching	<u>4</u>	Faulting	<u> </u>
Rutting	<u>0</u>	Broken Slabs	<u> </u>
		Bituminous Patching	<u> </u>
		Concrete Patch Det.	<u> </u>
		Blow-Up Repairs	<u> </u>

Yearly Maintenance Cost (\$/mi): 859

ALTERNATIVES

Proposed Improvements:

Flexible: Asphalt or Composite (AOCRC or AOPJC)

- G Seal Coat
- G Micro Surfacing
- : HBP - Thin Lift Overlay (1½") and Patching
- G Milling
- G Other: _____ ***

Concrete: (Jointed or Continuous Reinforced)

- G Minor CPR
- G • Spalls
- G • Blow-Ups
- G • Broken Panels
- G • Punchouts
- G • Joint & Crack Sealing
- G • Finger Joints (repair & replace)
- G • Underdrain (repair & cleaning)
- G Grinding
- G Other: _____ ***

*** If the proposed improvement is OTHER, discuss here, or include as an attachment.

Narrative of Proposed Improvements:

The proposed improvements are to overlay the existing roadway with 1 ½" of Hot Bituminous Pavement Class 27. No safety improvements will be done with this project.

This proposed improvement will improve the ride scores, maintain the roadway at a serviceable level, and delay the need for reconstruction.

Proposed Cross Sectional Elements:

Surfaced Roadway Width: 24 ft
Shoulder Width: 1.5 ft
Foreslope Ratio(H:V): 4:1

: Existing and Proposed Typical Sections are attached.

Existing and Proposed Typical Sections should be included for projects that change the roadway typical section including Micro Surfacing, HBP Thin Lift Overlay, HBP Patching, and Milling projects.

Proposed Special Design Elements:

Design Exception Proposed for shoulder width
(per Preventive Maintenance Guidelines): Yes X No _____
If yes, discuss the design exception and include as an attachment.

Estimated Cost: \$ 569,321.14

: Detailed Cost Estimate Attached

Programmed Cost: \$ 982,000

EXAMPLE

Use the State Transportation Improvement Plan to find Programmed Costs.

Cost Effectiveness:

Estimated Design Life of Proposed Improvement: 7 yrs

Estimated Cost/Mile: \$ 59,205.56

: The estimated service life and estimated cost per mile are within the range determined to be cost effective for the proposed improvements as identified in Design Memorandum 02-01 “Preventive Maintenance Cost Effectiveness Guidelines”.

G A Cost Effectiveness Analysis attached.

For work activities not identified in the Preventive Maintenance Cost Effectiveness Guidelines, the cost effectiveness shall be determined by comparing the Life Cycle Costs (Net Present Worth) for the proposed work versus reconstruction or other appropriate work.

IMPACTS

Wetlands: Yes No x
Cultural: Yes No x

Discussion:

Generally this work will be conducted only on top of the existing roadway so there will be no impacts to wetlands or cultural resources. If there is an activity proposed that may have an impact, it should be discussed in “Proposed Improvements” and the impacts discussed in this section.

SUMMARY OF DISTRICT ENGINEER AND OFFICE HOLDERS COMMENTS

District Engineer (Nick Ludwese)

Comments: No Comment

Office of Operations (Gary Berreth)

Comments: No Comment

Office of Project Development (Francis Ziegler)

Comments: No Comment

Office of Transportation Program Services (Tim Horner)

Comments: No Comment

DECISIONS

EXAMPLE

1) Should this project continue to be advanced?

Yes X No

2) Do you concur in the project concepts proposed?

Yes X No

Comments: _____

Approved:

Signed

Grant Levi, P.E., Deputy Director For Engineering

Date

Format Revised January, 2002

**Design Exception
SNH-6-081(058)218**

RP 218.580 to RP 228.331

EXAMPLE

The proposed preventive maintenance project will provide for a 1.5' shoulder and 2.5' sloughs at 4:1 slope. The existing roadway has a 1.5' shoulder at this time. Therefore, the roadway will not be degraded by applying a 1.5" overlay. The 3R standards for this rural two-lane highway require 3' shoulders for highways with an ADT of 751 or over. To meet full 3R or new design standards, the roadway would have to be widened or reconstructed. Therefore, a design exception is required. The existing foreslopes have a slope ratio of 4:1. Therefore, the foreslopes cannot be steepened. The cost to bring this section up to 3R standard shoulder width is estimated to be \$570,138. Mitigation for the narrow shoulder in the form of signing, 6" edge lines, or post delineators have been considered and will not be implemented.

As there have been no major crash problems on this section of highway, and the proposed shoulder widths are compatible with adjacent sections of roadway, a design exception is requested for the proposed shoulder width. Obtaining the full shoulder width would be more economical with a future 3R or reconstruction project at which time the pavement requires more extensive rehabilitation or replacement.

Recommend for Approval: Yes X No

 Signed
Francis Ziegler- Director, Project Development

 1-07-02
Date

Approval Yes X No

 Signed
Grant Levi-Deputy Director for Engineering

 1-07-02
Date

Design Exceptions will be submitted to FHWA for approval on projects on the National Highway System (NHS) that exceed \$1 million.

Detailed Cost Estimate

Item No.	Spec. No.	Code No.	Description	Units	Estimated Quantity	Unit cost	Total Cost
1	103	0100	Contract Bond	LSUM	1	\$ 7,200.00	\$ 7,200.00
2	401	0150	SS1H or CSS1H or MS1 Emulsified Asphalt	GAL	9,153	0.91	8,329.23
3	408	0196	Hot Bituminous Pavement 408 Special	TON	16,121	18.00	290,178.00
4	408	0445	PG 58-28 Asphalt Cement	TON	1,074	148.57	159,564.18
5	410	0105	Milling Bituminous Pavement	SY	533	1.00	533.00
6	702	0100	Mobilization	LSUM		32,923.37	32,923.37
7	704	0100	Flagging	MHR	140	14.28	1,999.20
8	704	1000	Traffic Control Signs	UNIT	1,523	3.18	4,843.14
9	704	1185	Pilot Car	HR	70	19.49	1,364.30
10	706	0300	Field Laboratory-Type C	EA	1	3,481.00	3,481.00
11	762	405	Short Term 4" Broken Line-Pnt Tape or Rsd Mk	LF	12,734	0.17	2,164.78
12	762	0410	Short Term 4" Line NPZ-Pn Tp or Ps Mrk	LF	2,930	0.10	293.00
13	762	1104	Pvmt Mk Painted 4 in. Line	LF	117,287	0.04	4,691.48
						Sub Total	\$517,564.68
						10% Eng. Cost	\$ 51,756.46
						Grand Total	\$569,321.14